



Geochemical record of the loess-paleosol sequence Süttő (Hungary) derived from X-ray fluorescence scanning of discrete samples

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The up to 20 m thick loess-paleosol sequence (LPS) Süttő is located in the northwestern part of the Pannonian Basin in Hungary on a Danube terrace close to the Transdanubian Mountains. Different from other Hungarian LPS, Süttő comprises a quasi-continuous time sequence from MIS 6 to MIS 2 as documented by luminescence age estimates and supported by relative palaeointensity data (RPI). Therefore, it can be considered as a key site for paleoclimate reconstruction representative for the Little Hungarian Plain. Potential loess source areas include Alpine and Carpathian material first transported fluvially by the rivers Danube and the Bikol creek and subsequently by aeolian transport. The LPS was continuously sampled with 2 cm increments.

We used an ITRAX XRF core-scanner to analyze each sample for its elemental composition from Al to U. Additionally, red green blue (RGB) color information was acquired for each sample. The resulting geochemical record with high spatial resolution enables new interpretation strategies. Summarizing all samples per lithological unit unravels geochemical variances within a lithological unit and may point to underlying geochemical and sedimentological processes such as weathering or dust-source changes. Moreover, clustering of the geochemical record by the Ward algorithm with 17 detectable elements provides a chemostratigraphy which is compared to lithology. Differences may indicate either transition zones or geochemical processes hidden by lithological parameters. Apart from that quantification of XRF-scanning results opens up the calculation of transfer functions aiming at quantifying paleo-precipitation and paleo-temperatures.

First results show elevated contents in conservative elements such as Si, Zr and Y in MIS 5 paleosols suggesting a strong pedogenesis. In addition, MIS 6 loess seems to have different dust sources than younger loess as indicated by changes in the Ti/Zr ratio. Transfer functions checked against climate-model results yield a good agreement for paleo-precipitation during MIS 5 while paleo-temperatures deviate from model results by several degrees Celsius during MIS 5 and the Last Glacial Maximum. Since the geochemical record is analyzed with the same increments like grain size, comparison of the geochemical record with existing and published proxy data provides much more options for the reconstruction of paleoenvironmental conditions throughout the last glacial-/interglacial cycle.